

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-5. (Cancelled)

6. (Currently Amended) A catalyst-deterioration diagnostic apparatus for diagnosing a deterioration state of a catalyst used for eliminating noxious substances contained in engine exhaust gas comprising:

~~index means for obtaining an indexer configured to obtain~~ a value of an index which is used for deciding the deterioration state of the catalyst:

~~a catalyst state estimation means for estimating estimator operative to estimate~~ a state of said catalyst at a time at which said ~~index means~~ indexer has obtained the index value, as to a physical quantity which affects a catalytic action of said catalyst;

~~a correction means for correcting element operative to correct~~ said index value obtained by said ~~index means~~ indexer, to a value in a standard state of said catalyst previously set as to the physical quantity, by the use of the estimated result of said catalyst state ~~estimation means~~ estimator; and

a mechanism operative to suspend a determination of the deterioration state of the catalyst if the value of the standard state value is outside a stored predetermined range ; and

~~a decision means~~ element endowed with a preset criterion value, ~~and for deciding to decide~~ said deterioration state of said catalyst by comparing the index value corrected by said correction ~~means~~ element, with the criterion value, wherein;

~~said catalyst serves to eliminate noxious substances which are contained in exhaust gas of an engine; and~~

said catalyst state estimation ~~means~~ estimator includes ~~an operating-situation detection means for detecting~~ detected operative to detect a value of that state variable of the engine which correlates with said physical quantity;

~~a memory means for storing~~ operative to store therein correspondence information which indicate correlations between values of the state variable and those of said physical quantity; and

~~an arithmetic means for determining~~ element operative to determine a value of said physical quantity by referring to the correspondence information on the basis of the detected result of said operating-situation ~~detection means~~ detector.

7. (Currently Amended) A catalyst-deterioration diagnostic apparatus for diagnosing a deterioration state of a catalyst which serves to eliminate noxious substances contained in an engine exhaust gas, comprising:

~~index means for obtaining~~ an indexer operative to obtain a value of an index which is used for deciding the deterioration state of the catalyst;

a decision means element endowed with a preset criterion value, ~~and for deciding to decide~~ said deterioration state of said catalyst by comparing the index value obtained by said ~~index means~~, indexer with the criterion value;

a catalyst state estimation means for estimating estimator operative to estimate a state of said catalyst at a time at which said ~~index means~~ indexer has obtained said index value, as to a physical quantity which affects a catalytic action of said catalyst; and

a suspension means element endowed with a predetermined range concerning the physical quantity, ~~and for causing to cause~~ said decision ~~means element~~ to suspend the decision on condition that a value of said physical quantity obtained by said catalyst state ~~estimation means~~ estimator is outside the predetermined range, wherein;

~~said catalyst serves to eliminate noxious substances which are contained in exhaust gas of an engine; and~~

said catalyst state [estimation means] estimator includes;

operating-situation ~~detection means for detecting~~ detector operative to detect a value of that state variable of the engine which correlates with said physical quantity;

a memory means for storing operative to store therein correspondence information which indicate correlations between values of the state variable and those of said physical quantity; and

an arithmetic means for determining mechanism operative to determine a value of said physical quantity by referring to the correspondence information on the basis of the detected result of said operating-situation ~~detection means~~ detector; and

a modifying element operative to modify the index value to a value in the standard state presently set, wherein the arithmetic mechanism compares the modified index value with a present value.

8.-16. (Cancelled)

17. (Previously Amended) A diagnostic apparatus for diagnosing a deterioration state of a catalyst in an engine, comprising:

a memory for storing a preset criterion value and a predetermined range for a state variable of the engine that correlates with a physical quantity affecting a catalytic action of the catalyst; and

a processor operatively connected to the memory for obtaining an index value indicative of a conversion efficiency of the catalyst, receiving a value of the state variable of the engine, suspending a determination of the deterioration state of the catalyst if the value of the state variable is outside the

predetermined range, and determining the deterioration state of the catalyst by comparing the index value with the preset criterion value if the value of the state variable is within the predetermined range.

18. (Previously Amended) The diagnostic apparatus of claim 17, wherein the physical quantity is a temperature of the catalyst and the state variable is selected from the group consisting of a quantity of intake air, a quantity of fuel injection, and a revolutions-per-minute of the engine.

19. (Previously Amended) The diagnostic apparatus of claim 17, wherein the preset criterion value represents a limit of deterioration calling for replacement of the catalyst.

20. (Previously Amended) A diagnostic apparatus for diagnosing a deterioration state of a catalyst in an engine, comprising:
a memory for storing a preset criterion value; and
a processor connected to the memory for obtaining an index value indicative of a conversion efficiency of the catalyst; receiving a value of a state variable of the engine that correlates with a physical quantity affecting a catalytic action of the catalyst; modifying the index value to a value in a standard state of the catalyst previously set as to the physical quantity using the

value of the state variable; and determining the deterioration state of the catalyst by comparing the modified index value with the preset criterion value.

21. (Previously Amended) The diagnostic apparatus of claim 20, wherein the physical quantity is a temperature of the catalyst and the state variable is selected from the group consisting of a quantity of intake air, a quantity of fuel injection, and a revolutions-per-minute of the engine.

22. (Previously Amended) The diagnostic apparatus of claim 20, wherein the preset criterion value represents a limit of deterioration calling for replacement of the catalyst.

23. (Previously Presented) A method of diagnosing a deterioration state of a catalyst in an engine, comprising:

- (a) storing a preset criterion value and a predetermined range for a state variable of the engine that correlates with a physical quantity affecting a catalytic action of the catalyst;
- (b) obtaining an index value indicative of a conversion efficiency of the catalyst;
- (c) detecting a value of the state variable of the engine;
- (d) suspending a determination of the deterioration state of the catalyst if the value of the state variable is outside the predetermined range; and

(e) determining the deterioration state of the catalyst by comparing the index value with the preset criterion value if the value of the state variable is within the predetermined range.

24. (Previously Presented) The method of claim 23, wherein the physical quantity is a temperature of the catalyst and the state variable is selected from the group consisting of a quantity of intake air, a quantity of fuel injection, and a revolutions-per-minute of the engine.

25. (Previously Presented) The method of claim 23, wherein the present criterion value represents a limit of deterioration calling for replacement of the catalyst.

26. (Previously Presented) A method of diagnosing a deterioration state of a catalyst in an engine, comprising:

- (a) storing a preset criterion value;
- (b) obtaining an index value indicative of a conversion efficiency of the catalyst;
- (c) detecting a value of a state variable of the engine that correlates with a physical quantity affecting a catalytic action of the catalyst;

(d) modifying the index value to a value in a standard state of the catalyst previously set as to the physical quantity using the value of the state variable; and

(e) determining the deterioration state of the catalyst by comparing the modified index value with the preset criterion value.

27. (Previously Presented) The method of claim 26, wherein the physical quantity is a temperature of the catalyst and the state variable is selected from the group consisting of a quantity of intake air, a quantity of fuel injection, and a revolutions per minute of the engine.

28. (Previously Presented) The method of claim 26, wherein the present criterion value represents a limit of deterioration calling for replacement of the catalyst.

29. (Currently Amended) The method of claim 23, wherein steps (d) and (e) are carried out by using a processor which obtains the index value and the state variable from a memory which stores a the present criterion value and the predetermined range for the state variable.

30. (Currently Amended) The method of claim 26, wherein steps (d) and (e) are carried out by using a processor which obtains the index value and

the state variable from a memory which stores a ~~predetermined range~~ the present criterion value for the state variable.